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Research Natural Area Proposal

Guatay Mountain

Descanso District, Cleveland National Forest

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INTRODUCTION

Administrative location

The proposed Research Natural Area is located principally within Sections 21, 22, 27, 28 and 29 of Township 15 S., Range 4 E., San Diego County, California. Access to the area is excellent as old highway 80 passes through the Samagatuma creek drainage along the northern base of Guatay Mountain. The top of the mountain can be reached by means of the fuel break which runs from the base of the mountain across from Farley Flat up the north side and along the main east-west running ridge. Much of the land on the mountain is privately owned (see Figure 1).

Distinctive features

Guatay Mountain possesses two principal features that distinguish it from the surrounding countryside.

The first and most outstanding natural feature is the presence of Cupressus forbesii (Tecate cypress). One fairly large, dense stand and numerous scattered trees are located on the north slope of the mountain. Cupressus forbesii is a rare plant (Powell, 1974), occurring only in scattered stands on several mountains in southern California and northern Baja. Dense stands of Cupressus, the typical habit for the species, constitute a unique chaparral vegetation type.

The second distinctive feature of Guatay Mountain is its geology. Guatay is largely composed of mafic rock types, loosely termed "gabbro". It is well known that ultramafic, commonly referred to as "serpentine", soils have profound influences on vegetation, excluding or causing poor

growth in many plant species (Whittaker et al., 1954; Proctor and Woodell, 1975). In addition, ultramafic soils tend to harbor rare plant species not found on other soil types. Recently, local botanists have begun to suspect that mafic, or gabbroic, soils in San Diego County may have a similar effect on chaparral vegetation (Oberbauer, 1979; Sproul, 1979). A number of rare plants in San Diego County are thought to be, in some way, associated with gabbroic soils and two of these species are present on Guatay Mountain, Calochortus dunnii and Calamagrostis densa. The presence of Cupressus forbesii may also be related to gabbro soils. Research is needed to improve our understanding of the effects of mafic substrates on the vegetation.

PHYSICAL SETTING

Geography

Guatay Mountain belongs to the montane physiographic province of San Diego County. Mountains in this province are variable in form. Slopes tend to be steep, and complex faulting and drainage have resulted in a landscape of rugged overall character. Guatay is situated about 10 miles west of the Laguna Mountains which form the main crest of the montane province in the southern part of the county. The Cuyamaca Mountains are located just a few miles to the north.

In overall form, Guatay Mountain is roughly conical. Instead of rising to a single peak, however, the north and south slopes are extended, creating a prominent east-west running ridge. Approaching from the west, the mountain is smooth sloped and fairly symetrical, but from other directions the topography is more complex. Guatay Mountain possesses three high points, all along the east-west running ridge. The middle peak is the highest, reaching 1470 m (4885 ft) in elevation. Elevations of the lands surrounding the mountain are somewhat variable. Farley Flat on the northern side and Pine Valley to the south lie at approximately 1200 m (4000 ft), while Descanso Valley to the west is over one hundred meters lower at 1023 m (3400 ft). On average, Guatay Mountain stands about 300 m (1000 ft) above the surrounding countryside. Slopes range from 10 to 70 percent. Northern and eastern slopes tend to be steeper than the south facing slopes.

Climate

West of the main crest of the montane province, climate in San Diego County is profoundly influenced by the Pacific Ocean and its

semi-permanent pressure systems. In general, temperatures are mild and precipitation occurs primarily in the winter months. The mean annual temperature in the montane province is 12.7° C (55° F) and precipitation, some falling as snow, ranges from 31 to 102 cm (12 to 40 in) a year (U.S.D.A., 1973).

The closest weather station to Guatay Mountain is located about 5 km (3 miles) to the west of Descanso (1023 m, 3400 ft). Over a thirty year period, average annual precipitation was 64 cm (25.2 in) with 11 cm (4.33 in) falling in the month of January and only 0.6 cm (.22 in) in July (Close et al., 1970). Data on temperature is not available for the Descanso Station. Since elevation strongly effects temperature and precipitation, climate data from the Cuyamaca weather station (1400 m, 4650 ft), approximately 13 km (8 miles) from Guatay Mountain, is probably more representative. Average annual precipitation here is 93.5 cm (36.82 in). Distribution of rainfall is the same as at Descanso with most falling in the winter months. Temperatures at Cuyamaca range from the January mean of 3.9° C (39° F) to the July mean of 21.2° C (70.1° F). The highest recorded temperature is 38° C (100° F) and the lowest is -19° C (-4° F) (Close et al., 1970).

Geology and soils

The geology of interior San Diego County is dominated by the Peninsular Ranges batholith, a large body of intrusive igneous rock that is exposed from Riverside County to the tip of Baja California (Weber, 1963). Major rock types and their approximate percentage contribution to the bulk composition of the batholith include granite-2 to 1/2 percent, granodiorite-34 percent, tonalite-50 percent, and gabbroic rock-14 percent (Larson, 1948).

Within the Peninsular Ranges batholith, gabbroic rock types tend to form units called plutons and are thought to have been emplaced separately as the parent magma cooled (Itson, 1970; Illis, 1978; Nishimori, 1976). Because of this, gabbro plutons are scattered as discrete islands throughout the more common granitic rocks which comprise most of the batholith. Even though the various gabbro plutons within San Diego County probably arose from the same magma, their composition is highly variable.

Guatay Mountain is composed largely of gabbroic rock. Its base roughly coincides with the boundary of one of the gabbro plutons within the batholith. Nishimori (1976) has identified and mapped the various rock types in and around the Guatay Mountain pluton (see Figure 2). Major gabbroic units include amphibole gabbro, gabbro, and olivene gabbro. The mountain is surrounded almost completely by tonalites, except for the southwest corner where gabbroic rocks contact metamorphic rock known as Julian schist.

The principal mineral components of the gabbroic rocks on Guatay include olivene, augite, hornblende, and plagioclase (a feldspar). Olivene gabbro contains all of the above minerals. Gabbro and amphibole gabbro are distinguished by a lack of olivene. Amphibole gabbro contains a large proportion of hornblende and other amphibole minerals (Nishimori, 1976).

Gabbroic rocks are readily weathered, and it is thought that as a result gabbro plutons tend to form broad based, conical hills with few rock outcrops (Weber, 1963). Guatay Mountain is no exception, being much more rounded and containing fewer outcrops than surrounding granitic peaks. Soils tend to be red or reddish brown in color and accumulate even on steep slopes (40%) to over 76 cm (30 in) in depth. The 1973 U.S.D.A.

soil survey of San Diego County places the soil on Guatay Mountain within the Las Posas soil series. Las Posas soils are described as being well drained, zonal soils with a high to very high erosion hazard. A representative profile would include an A horizon, a stoney fine sandy loam about 10 cm (4 in) thick; a B horizon, clay to light clay in texture about 74 cm (29 in) thick and a C horizon of decomposing gabbro. Pits have not been dug on Guatay but an exposed profile along a dirt road cut near Guatay campground indicates that soils are similar to the general description for the Las Posas series.

PAST USES AND IMPACTS

Archeological

According to Ken Hedges at the Museum of Man, no archeological surveys have been performed on Guatay Mountain. There is a good possibility, however, that Indian artifacts may be located on or near the top of the mountain. Guatay Mountain is located near the former sites of two Indian villages, one in Pine Valley and one in the vicinity of Descanso. Mountain tops and high ridges near villages were commonly used for ritual purposes and solstice observatories. Such areas are marked by rings or lines of stones.

Current

Human impacts of more recent origin have resulted largely from access improvements on private land and fire suppression activity, in the form of fuel breaks, on public land. Neither have much affected the distinguishing natural features of the mountain. Disturbances on private lands near the town of Guatay have been confined to mixed chaparral vegetation and are not extensive. Fuel breaks, implemented by the Forest Service in a successful attempt to halt the northerly spread of the 1970 Laguna fire, may be of greater significance. Major breaks, especially the one along the east-west running ridge of the mountain, harbor a number of rare plant species, including Calochortus dunnii, Calamgrostis densa, and Mimulus clevelandii. A short fuel break beginning near Guatay campground runs very close to the northern limit of the Tecate cypress stand. The disturbance does not seem to have had any irreversible effect. In fact, a number of seedling cypress can be found in the break.

U.S. Forest Service records show that since the turn of the century when records were begun, three fires occurred on Guatay Mountain before the 1970 Laguna fire. These fires took place in 1928, 1931, and 1941, all burning a small number of acres on the north slope of the mountain. Little is known about the impact of these fires or of associated fire suppression activity on the vegetation.

BIOLOGY

Vegetation types

According to a recent classification scheme developed by Cheatham and Haller (1975), there are four distinct habitat (vegetation) types on Guatay Mountain. They are: 1) California mixed chaparral, 2) Chamise chaparral, 3) Southern interior oak woodland, and 4) Southern interior cypress forest. These habitat types have been mapped in Figure 3 (vegetation boundaries are delineated from aerial photos and field survey information).

Cheatham and Haller's scheme is basically a more detailed and refined version of the well known Munz and Keck (1959) classification of California Plant Communities. The authors state that specific habitat types possess quantitative and qualitative differences capable of being measured and mapped, and are recognizable at disjunct locations. They also state, however, that a large element of subjectivity was involved in decisions regarding which groups of plants warrented description as distinct vegetation units. The extent, location, and species composition of the four habitat types found on Guatay Mountain are briefly discussed in the following sections. A species list for Guatay Mountain compiled by Fred Sproul and Clay Gautier is given in Appendix A.

"California Mixed Chaparral"

Mixed chaparral is characteristically composed of broad leaved sclerophyllous shrubs which form dense, often impenetrable stands.

Shrubs usually reach a height of from 2-4 m and there is little or no herbaceous understory.

California mixed chaparral is found predominantly on the north slope of Guatay Mountain. Stands are also found on the western slope and at higher elevations on the south slope of the mountain. Total acerage of mixed chaparral on Guatay Mountain based on estimated boundaries taken from aerial photos is 2035.8 acres, making it the most extensive of the four habitat types. Predominant shrub species composing mixed chaparral on Guatay Mountain are Arctostaphylos glandulosa, Adenostoma fasciculatum, Ceanothus greggii, Quercus dumosa, Cercocarpus betuloides and Yucca whipplei. The California mixed chaparral on Guatay is unusual in that an understory containing Salvia sonomensis is well developed (see photo I).

"Chamise Chaparral"

Chamise chaparral, the predominant habitat type in San Diego County, is similar to California mixed chaparral but is less dense and less rich in species composition. Mesic species, such as Heteromeles arbutifolia and Cercocarpus betuloides are not present. Chamise chaparral on Guatay Mountain is found on south facing slopes at lower elevations. Analysis of aerial photos gives an estimate of 335.2 acres. Adenostoma fasciculatum is the most abundant species but individuals of several other shrub species, especially Arctostaphylos glandulosa are scattered throughout the stands. There is no understory.

"Southern Interior Oak Woodland"

Southern interior oak woodland is dominated by two species of oak in San Diego County, Quercus agrifolia and Quercus engelmannii. These

two oak species typically form dense, nearly closed woodland in mesic valleys and drainages. Grasses are usually abundant under openings in the canopy with shrubs and herbaceous plants predominating in shaded areas.

Southern interior oak woodland is found in drainages around the base of Guatay Mountain. Stands are found along Samagatuma Creek and in Farley Flat around the town of Guatay and at Guatay campground. Extensive stands are also found in Pine Valley on the southern side of Guatay Mountain. Estimates from aerial photos indicate a total acerage of 466.5 acres for stands south of old highway 80 in immediate proximity to the mountain. Quercus engelmannii apparently is absent from these stands.

"Southern Interior Cypress Forest"

Southern interior cypress forest usually consists of scattered stands of dense, even aged trees of a single cypress species. On Guatay Mountain, southern interior cypress forest is represented by a small stand of Cupressus forbesii on the north facing slope immediately southwest of Guatay campground. The stand covers approximately 46.8 acres and consists of dense pockets of cypress interspersed with mixed chaparral (photo 2). A large area in the middle of the stand is devoid of trees, containing only a sparse scattering of Cercocarpus betuloides. Dense pockets of cypress have no understory but throughout the stand, Sanicula crassicaulis, Bloomeria crocea and Guterriezzia sarothrae are common.

Two other unique habitat types, too specific to be treated by Cheatham and Haller, are present on Guatay Mountain and deserve mention.

On the northern side of the mountain, at higher elevations, Quercus chrysolepis forms dense island-like clumps that are quite distinct from the surrounding chaparral (photo 3). Clumps are composed of one to several trees which reach heights of from 4-10 m. These oak islands may be of some importance to wildlife.

The second unique habitat type occurs on the south slope of Guatay Mountain just below the mountain's highest peak. Here, an unusual association of species, dominated by Haplopappus arborescens, Ceanothus foliosus, and Helianthemum scoparium, covers a small but significant area (photo 4). Typical shrubs such as Adenostoma fasciculatum and Arctostaphylos glandulosa are present but in very reduced frequencies. Overall, the vegetation is very open and shrubs quite small in size.

Rare and disjunct plant species

Four species of plants found on Guatay Mountain are considered to be rare (Powell, 1974; Sproul, personal communication). These are Cupressus forbesii, Calochortus dunnii, Calamagrostis densa and Mimulus clevelandii. The following presents a brief description of the species status and their distribution on Guatay Mountain (see Figure 4). The presence of rare species of plants, especially Cupressus forbesii, is one of the principal reasons for considering Guatay Mountain for Research Natural Area status.

Cupressus forbesii (Tecate cypress)

Cupressus forbesii is one of several cypress species in the California Floristic Province which exhibit very restricted distributions. The tree is listed by the California Native Plant Society Inventory as being rare but not endangered.

On Guatay Mountain, Cupressus is found principally in a single, old, mostly even aged stand on the north slope. The center of the stand is located about 200 m south southwest of Guatay campground. This stand is remarkable for its age and the great size of some of its individuals. Ring counts from a small sampling of trees within the stand give an average age of 92 years (Appendix B contains the raw data). Trees at the bottom of the slope appear to be somewhat younger (~80 years) than trees further up the side of the mountain (~100+ years). Additionally, a small number of trees are scattered throughout one of the major north slope drainages to the east of the main stand (photo). These trees are most frequent near the fuel break which runs from Old Highway 80 near the town of Guatay to the top of the mountain. Ring counts indicate that these trees are younger than those in the main stand with an average age of 29 years (see Appendix B for raw data).

Calochortus dunnii (Dunn's Mariposa Lily)

Calochortus dunii has an extremely limited distribution. It is listed by C.N.P.S. as being very rare. The federal register lists Calochortus as being threatened. The plant has been found along the fuelbreaks and other disturbed sites on Guatay Mountain. A dense stand occurs in a slump at the end of a dirt road about 100 m from Guatay campground. The species appears to be adapted to recent openings in the vegetation, such as those caused by fuelbreaks, but it may also be well suited to natural openings such as areas of shallow soil or recent burns.

Calamagrostis densa

Calamagrostis densa is another species apparently stimulated by recent disturbance. The C.N.P.S. inventory lists Calamagrostis as

very rare. Over its range, however, the species is thought to be stable. On Guatay Mountain, Calamagrostis has been found only along fuelbreaks. It is most frequent in the saddle between the middle peak and the lesser peak to the east.

Mimulus clevelandii

Mimulus clevelandii has apparently been fostered by recent disturbance. Mimulus is listed as rare by the C.N.P.S. but little is known about population stability. Like Calamagrostis, Mimulus has only been found along fuelbreaks on Guatay Mountain.

Disjunct species

Two other species present on Guatay Mountain, although not rare, are worth mentioning for their unusual distributions. Salvia sonomensis and Ceanothus foliosus are both fairly common species in northern California, occurring in the coast ranges and the foothills of the Sierra. Both species also occur on several mountains in San Diego County including Guatay. They are not found, however, in suitable habitat in mountain ranges between these areas.

Fauna

No detailed studies on the fauna of Guatay Mountain have been performed to our knowledge. The Cupressus forbesii stand constitutes the only distinctive vegetation type of the mountain and, at present, no special association is suspected between Cupressus and any vertebrate animal species. Therefore, we have compiled lists of birds, mammals, reptiles and amphibians that could potentially occur on the mountain in Appendix C. The bird list was compiled by Greg Loeb after two censuses of the mountain. Invertebrates have not been considered.

RECOMMENDATIONS

This section will be organized in three parts. In the first we will discuss the major values to be preserved, in the second the special problems in managing to preserve the major values, and in the third we will give our specific management recommendations. We recognize that management of an area the size of Guatay Mountain involves many economic and political constraints. Although we believe we are making realistic suggestions, we have not attempted to research all of the practical problems involved in implementing our recommendations. We hope that they will serve as a useful starting point.

Values to be preserved

We consider that these are the major values deserving protection and enhancement:

1. Scenic value. Guatay Mountain is a local landmark visible for many miles, and to the person who appreciates rugged semi-arid landscapes it is beautiful. The pleasing appearance derives from its relatively undisturbed cover. Roads, buildings, fuel breaks, and other scars disrupt the unbroken cover and advertise the intrusive and insensitive hand of man.

2. Rare and interesting species. The species of particular interest that occur on Guatay Mountain have been described in earlier sections. The presence of these species greatly enhances the interest of the area to the general public and to persons with a professional interest in natural vegetation. Management must insure that populations of significant taxa are maintained.

3. An unusual natural ecosystem. Because of its geographical location, and distinctive soil and climate Guatay Mountain has a chaparral ecosystem that is of above average interest even if the presence of rare and interesting species is discounted. Though the vegetation is primarily chaparral, the presence of well distributed clumps of canyon live oak suggest that the north side of the Guatay may have been forested in recent times. It is a good example of a transitional area between forest and chaparral.

Some of the oldest chaparral in the county is found on the north side of Guatay Mountain. It has a richer assemblage of species than most areas of comparable size. The structure of the vegetation is variable, ranging from low and open at the top, to unusually tall and dense on parts of the north facing slopes.

We believe that the entire ecosystem has value which transcends that of any of its constituent species. There is value in the entire system as an interrelated whole.

Problems of management

In achieving management goals, there are several problems that must be overcome. The more important of these are:

1. Ownership. Much of Guatay Mountain is privately owned (see Figure 1). The property lines do not correspond to natural boundaries in vegetation types, and conform only slightly better to present land use. Management will be more difficult if the entire mountain cannot be treated as a block. To mention only one problem, the aesthetic benefits of maintaining an unbroken cover of natural vegetation on public land will be largely offset if half of the mountain is a trailer park.

2. Fire management. The unrealistic expectations of the public with regard to the containment of wildfires creates difficulties for the Forest Service and other public agencies and has had unfortunate consequences on efforts to conserve natural landscapes. There is a small but growing population near Guatay Mountain, and pressure for fire control is likely to increase.

None of the current methods of fire control are without risks to the values that should be protected. The traditional method of doing little or nothing until a fire occurs and then deploying the maximum number of men and machines to contain it has led in the past to many of the scars that now occur on the mountain. The more sophisticated methods currently in favor, type conversion and fuel management, pose other problems.

We have argued that from a scientific point of view the value of Guatay Mountain derives from the ecosystem that is found on it. Fuel management, whether by type conversion or controlled burning would probably alter the present vegetation and disrupt the natural species interactions. It is debatable whether or not fuel management would improve the aesthetic values. In the short run some unsightly scars would be inevitable. Overall we tend to view fuel management as a potential threat to the value that should be preserved. Careful planning will be necessary to insure that minimum harm is done.

3. Rare and interesting species. It is generally agreed that the best way to preserve a species is to preserve the habitat in which it occurs, and that the management of species is inevitably the management of ecosystems. We also suggest that in protecting a rare plant the main objective should be to minimize the probability of extinction

rather than to maximize population size. The two goals can be the same, but may also be quite different. The abundance of most rare species could probably be increased by management, but undue human intervention without considerable knowledge can disrupt species interrelations and in the long run pose a greater risk to the species than maintaining a smaller population. We feel that a conservative approach to managing rare species is best. The rare species on Guatay Mountain have been there for many centuries, and in the absence of detailed population studies it is just as reasonable to suppose that they will persist for centuries more as it is to assume they must be headed for extinction because they are rare. In the preservation of rare plants, doing nothing, even if its wrong is the best short-range management strategy.

There is another reason to minimize management of rare species. Most rare species are interesting because they are rare, and are unremarkable when removed from their ecological context. Calmagrostis densa is a good example. A Calmagrostis plant in a flower pot is comparable to a square inch of canvas from the Mona Lisa--both are of little interest out of their context. Whenever possible, rare species should be preserved in a natural and minimally disturbed ecosystem in which they may be observed and studied in their proper context.

Tecate cypress presents a special problem. As a closed cone conifer, it relies on fire for reproduction. Observations of the recovery of cypress stands from wildfires on Otay and Tecate Mountains have shown that stands younger than 40 years at the time of the fire have been replaced by seedling stands with a lower density of individuals. The implication is that burning cypress stands at thirty year intervals would cause a gradual reduction in cypress abundance.

But the consequences of excluding fire completely would perhaps be even more serious. The cones of Tecate cypress do gradually open after being on the tree several to many years. But the release of seed is inefficient, and many seeds probably lose viability before they are shed. Seedlings occur in mature cypress stands, but they rarely live beyond a single year. While some new individuals might become established in senescing stands, it seems certain that the density of cypress individuals would decline drastically without fire. Seedlings do become established in disturbed areas such as on the fuel breaks on the lower slopes of Guatay Mountain. But seed dispersal in cypress is inefficient and artificial scattering of seeds would probably be necessary if uniform stands were to be established by this means.

The problem is how to manage an area to maintain a healthy population of cypress. The best way would be to burn the cypress with a crown fire at the point when the cone crop is at its largest, probably at an age of 50 to 100 years. This long period between fires may be incompatible with plans to reduce fuel loading, and it will probably be necessary to treat the cypress areas on Guatay as separate management blocks if a controlled burning program is undertaken.

Though in detail the age structure of the cypress stand is complex, the bulk of the stand is over 100 years old. The trees appear to be healthy and capable of surviving for many more years. There are a few dead snags in the stand that presumably date from the previous fire, and which are as large as the largest trees now alive on Guatay. Because of their advanced stage of decay, it is not possible to age them, but it seems probable that they were at least as old at the time of the fire as the existing trees. We believe that the Guatay stand would reestablish itself if there were a wildfire in the near future.

More drastic management could maintain the cypress without fire or with minimal fire. For example, areas could be scraped and artificially seeded. The success of cypress in existing fuel breaks suggests that trees could become established and do well. However, we strongly oppose this approach except in circumstances where the cypress face imminent extinction.

The existing stand of Tecate cypress appears to be in good health and not conspicuously declining, though some dead trees are present. Our best judgement is that the trees would successfully regenerate if they were burned in the next few years. This makes it less urgent, probably actually undesireable to protect the cypress from wildfire at this time.

Specific recommendations

1. We feel that Guatay Mountain possesses sufficient interest and value to merit designation as a Research Natural Area. We justify its nomination on the basis of its interesting geology, unique species, significant ecosystem, and aesthetic value.

2. We recommend that land trades and purchase be used to consolidate Forest Service ownership on the mountain. The entire mountain is the logical management block. We also feel that it is in the best interests of the public for the mountain to be publically owned. It is a logical area to preserve.

3. Management should be minimal. Aside from fire protection, we see no reason to undertake a large scale management program. We believe that the rare species on Guatay have the excellent prospects of survival without any action being taken at this time. We acknowledge

that it might be possible to increase the populations of some of the rare and interesting species through management, but only at the cost of disrupting the operation of the natural processes.

4. Adopt a policy of "watchful waiting" for the Tecate cypress. There are two serious natural hazards for the cypress--fire too soon and fire too late. Since the cypress grove on Guatay is probably the oldest in the County, the first hazard clearly is not a problem now, and it is the second that must be guarded against. Although there are no data on the fate of perpetually unburned cypress, it is reasonable to assume that eventually stands must decline. Some regeneration would surely occur, but competing shrubs and herbs probably would gradually increase at the expense of the cypress until only scattered individuals were left.

We believe that the cypress stand on Guatay is relatively stable, and that it is not yet senescent. If it were to burn in 1980, it would certainly reestablish. There is no reason to expect a dramatic change in this situation in five years, and we recommend that no special management be directed to Tecate cypress during this period.

If a wildfire occurs, it should be allowed to burn through the grove, and no attempt made to stop it in or near the cypress stands. After the fire, the seedling abundance should be monitored.

If a new post-fire stand of cypress is established, there is the risk that it will burn before it has produced enough cones to insure ample reproduction at the next fire. If trends toward increasing numbers of wildfires continue, it may be desireable to use controlled fires to reduce the fuel loading in areas adjacent to the cypress. Whether or not this will be desireable will depend on the circumstances

after the fire and the degree to which disruption of the vegetation is necessary to carry out the burns.

If wildfire does not occur within five years, the cypress stand should be investigated for signs of severe decline. If there is widespread mortality and a corresponding decrease in the number of cones, it may be advisable to use a controlled fire to regenerate the cypress. But there are dangers in the use of fire and we advise that fire should only be used in the cypress in a conservative and experimental way.

Cypress will regenerate well after the most severe crown fires, but its response to moderate to cold fires is uncertain. Cypress is surprisingly sensitive to fire. Trees that are touched by flames rarely survive, and many are killed by radiant heat alone without actually catching fire. They will also be killed by heat insufficient to open the closed cones.

Wildfires that burn through only a part of cypress stands leave a band of dead but unburned trees at the margin. A poorly conducted controlled burn could kill trees without opening many cones. Less intense fires may also permit a larger number of shrub and herb seeds to survive, increasing competitive pressure on the cypress. Cold controlled burns repeatedly applied may do more harm than no fire at all.

These problems could be overcome if the controlled fire was very hot and allowed to crown. We wonder if it is possible to have an intense burn using standard prescriptions. If a hot burn could be assured, fire management of the cypress would be a more attractive management option. For the present, we recommend a let burn policy.

5. Do not attempt type conversion. Type conversion probably cannot be justified economically on Guatay Mountain, and it would do irreparable harm to the features of biological interest.

6. Adopt a fire management policy that will allow the larger part of the mountain to be treated as a single block which could be left unburned for as long as possible. If fuel and fire breaks are to be constructed, they should be confined to the lowest possible slope positions to reduce their visibility and to do minimal harm to the upper slopes. We feel that it would be better to put larger fuel breaks at the bottom of the mountain rather than smaller ones at many points. This will confer several advantages. First, it will eliminate the need for fuel reduction over most of the mountain, which in the event of wildfire, could be allowed to burn. Second, it would protect the mountain from wildfire from adjacent areas, which would be helpful in managing the cypress. Third, it will be easier and cheaper to maintain the fuelbreaks at a low elevation, and the soils of the lower slopes probably will support better stands of grass.

7. We cannot make detailed recommendations for the rare species. We believe that there is little risk of extinction of even the rarest of these if the area is left undisturbed. However, the populations of the herbaceous species could probably be temporarily increased by burning and perhaps even clearing. As we have pointed out above, we doubt that increasing the population size significantly decreases the probability of extinction of the species, and we recommend against clearing or burning solely for the sake of increasing populations of rare plants.

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APPENDIX A
VASCULAR PLANT
SPECIES LIST FOR GUATAY MOUNTAIN

Compiled by Fred Sproul and Clay Gautier

DICOTYLEDONAE

Anacardiaceae
Rhus ovata Wats.
Toxicodendron diversilobum (T. + G.) Greene

Apiaceae
Sanicula crassicaulis Poepp. ex DC

Asteraceae
Centaurea melitensis L.
Cirsium sp.
Eriophyllum confertiflorum (DC.) Gray var. confertiflorum
Gnaphalium microcephalum Nutt.
Gutierrezia sarothrae (Pursh) Britt. + Rusby
Haplopappus arborescens (Gray) Hall ssp. parishii (Green) Blake
Haplopappus squarrosus H. + A. ssp. grindelioides (DC.) Keck
Helianthus gracilentus Gray
Sonchus asper (L.) Hill
Wyethia ovata T. + G.

Berberidaceae
Berberis dictyota Jeps.

Boraginaceae
Cryptantha micrantha (Torr.) Jtn.
Plagiobothrys sp.

Brassicaceae
Brassica nigra (L.) Koch.
Arabis sp.

Campanulaceae
Triodanis biflora (R. + P.) McVaugh

Caprifoliaceae
Lonicera subspicata var. johnstonii Keck
Symphoricarpos mullis Nutt. in T. + G.

Cistaceae
Helianthemum scoparium Nutt.

Cupressaceae
Cupressus forbesii Jeps.

Ericaceae
Arctostaphylos glandulosa Eastw. ssp. glandulosa
Arctostaphylos pungens HBK

Fagaceae
Quercus agrifolia Nee var. agrifolia
Quercus dumosa Nutt.
Quercus chrysolepis Liebm.
Quercus X morehus Kell.
Quercus wislizenii A. DC var. frutescens Engelm.

Garryaceae
Garrya flavescens Wats. var. pallida (Eastw.) Bacig. ex Ewan.

Gentianaceae
Frasera parryi Torr.

Geraniaceae
Erodium circutarium (L.) L'Her.

Hydrophylaceae
Turricula parryi (Gray) Macbr.

Laminaceae
Monardella macrantha Gray ssp. macrantha
Salvia clevelandii (Gray) Greene
Salvia sonomensis Greene
Scutellaria tuberosa Benth.
Trichostema parishii Vasey

Onagraceae
Clarkia purpurea (Curt.) Nels. + Macbr.
Zauschneria californica Presl. ssp. angustifolia Keck

Platanaceae
Platanus racemosa Nutt.

Polemoniaceae
Linanthus nuttallii (Gray) Green ex Mlkn. ssp. floribundus (Gray) Munz.

Polygonaceae
Chorizanthe fimbriata Nutt.
Eriogonum fasciculatum Benth. ssp. fasciculatum

Ranunculaceae
Clematis lasiantha Nutt. in T. + G.
Delphinium patens Benth. ssp. hepaticoideum Ewan.

Rhamnaceae
Ceanothus greggii Gray. var. perplexans (Trel.) Jeps.
Ceanothus foliosus Parry.
Rhamnus californica Esch. ssp. californica
Rhamnus crocea Nutt. in T. + G.

Rosaceae
Adenostoma fasciculatum H. + A.
Adenostoma sparsifolium Torr.
Amelanchier utahensis Koehne.
Cerocarpus betuloides Nutt. ex. T. + G.
Heteromeles arbutifolia (Ait.) M. Roem.
Potentilla glandulosa Lindl.
Rosa californica Cham. + Schlecht.

Rubiaceae
Galium angustifolium Nutt. ssp. angustifolium

Scrophulariaceae
Cordylanthus filifolius Nutt. ex Benth. in DC.
Keckiella ternata (Torr. ex Gray) Straw ssp. ternata
Mimulus clevelandii Bdg.
Penstemon heterophyllus Lindl.

Salicaceae
Salix lasiolepus Benth.

Solonaceae
Solanum tenuilobatum Parish.

Viscadeae
Phoradendron villosum (Nutt. in T. + G.) (on Quercus chrysolepis)

MONOCOTYLEDONEAE

Agavaceae
Yucca whipplei Torr. ssp. whipplei

Amaryllidaceae
Bloomeria crocea (Torr.) Cov. var. crocea
Dicholostemma pulchellum (Salisb.) Heller

Liliaceae
Calochortus albus Dougl. ex Benth.
Calochortus dunnii Purdy.
Calochortus concolor (Baker) Purdy

Poaceae
Avena barbata Brot.
Bromus rubens L.
Bromus mollis L.
Calamagrostis densa Vasey.
Festuca megalura (Vulpia m.)
Melica sp.
Stipa coronata Thurb. in Wats. var. coronata.

Orchidaceae
Habenaria elegans (Lindl.) Boland.

CRYPTOGAMS

Pleridaceae
Cheilanthus clevelandii DC.

APPENDIX B

RAW CORE DATA FROM C. FORBESII TREES ON GUATAY MOUNTAIN

No.	Location	Ring Count (approx. age)
1	bottom of main stand	78
2	middle of main stand	76
3	middle of main stand	80
4	bottom of main stand	71
5	middle of main stand	80
6	bottom of main stand	82
7	bottom of main stand	65
8	bottom of main stand	80
9	middle of main stand	101
10	middle of main stand	106
11	top of main stand	112
12	middle of main stand	92
13	bottom of main stand	107
14	middle of main stand	97
15	middle of main stand	104
16	top of main stand	122
17	bottom of main stand	92
18	bottom of main stand	96
19	middle part of main stand	108
20	middle part of main stand	104
21	middle part of main stand	96
22	scattered trees near fuelbreak	34
23	scattered trees near fuelbreak	24
24	scattered trees near fuelbreak	28

APPENDIX C

POTENTIAL LIST OF VERTEBRATE ANIMAL SPECIES ON GUATAY MOUNTAIN

(A question mark preceeding species name indicates a large degree of uncertainty about its presence on the mountain.)

MAMMALS

Brush Rabbit	Sylvilagus bachmani
Desert Cottontail	Sylvilagus audubonii
Black-tailed Jack Rabbit	Lepus californicus
White-tailed Antelope Squirrel	Ammospermophilus lencurus
California Ground Squirrel	Spermophilus beecheyi
?Little Pocket Mouse	Perognathus longimembris
San Diego Pocket Mouse	Perognathus fallax
California Pocket Mouse	Perognathus californicus
Agile Kangaroo Rat	Dipodomys agilis
?Western Harvest Mouse	Reithrodontomys megalotis
?Cactus Mouse	Peromyscus eremicus
California Mouse	Peromyscus californicus
Deer Mouse	Peromyscus maniculatus
Brush Mouse	Peromyscus boylii
Southern Grasshopper Mouse	Onychomys torridus
?Desert Woodrat	Neotoma lepida
Dusky-footed Woodrat	Neotoma fuscipes
Coyote	Canis latrans
?Gray Fox	Urocyon cinereoargenteus
?Ringtail	Bassariscus astutus
Raccoon	Procyon lotor
?Long-tailed Weasel	Mustela frenata
?Badger	Taxidea taxus
Western Spotted Skunk	Spilogale gracilis
Striped Skunk	Mephitis mephitis
?Bobcat	Lynx rufus
Mule Deer	Odocoileus hemionus

REPTILES

Western Fence Lizard	Sceloporus occidentalis
Coast Horned Lizard	Phrynosoma coronatum
King Snake	Lampropeltis getulus
Gopher Snake	Pituophis melanoleucus
Side Blotch Lizard	Uta stansburiana
Grassland Lizard	Sceloporous graciosus
California Whiptail	Cnemidophorous tigris
Orange Throated Whiptail	Cnemidophorous hyperrythrus
Pacific Rattlesnake	Crotalus viridis
Banded Gecko	Coleonyx variegatus
Western Skink	Eumeces skiltonianus
Gilbert's Skink	Eumeces gilberti
Southern Alligator Lizard	Gerrhonotus multicarinatus
Western Blind Snake	Leptotyphlops humilus
Rosy Boa	Lichanura trivirgata
Striped racer	Masticophis lateralis
Western Black Headed Snake	Tantilla planiceps
Night Snake	Hypsiglena torquata

AMPHIBIANS

Ensatina	Ensatina eschscholtzi
Arboreal salamander	Aneidus lugubris
California Slender Salamander	Batrachoseps attenuatus
Western Toad	Bufo boreas
Pacific Treefrog	Hyla regilla

APPENDIX C (cont'd.)

CHECKLIST OF BIRDS OF GUATAY MOUNTAIN

Compiled by Gregory M. Loeb

Common Name	Scientific Name	P/O[1]	Habitat[2]	Occurrence[3]	Status[4]
Sharp-shinned Hawk	Accipiter striatus	P	OR	U	M
Cooper's Hawk	Accipiter cooperii	P	OR	U	M R
Red-tailed Hawk	Buteo jamaicensis	O	OR Ar	C	R
Red-shouldered Hawk	Buteo lineatus	O	OR	C	R
Golden Eagle	Aquilla chrysaetos	P	Ar	U	R
American Kestrel	Falco sparvarius	P	OR	C	R M
California Quail	Lophortyx californicus	O	Ch C	C	R
Mountain Quail	Oreortyz pictus	P	Ch	U	R
Band-tailed Pigeon	Columba fasciata	O	OR C	C	R
Mourning Dove	Zenaida macroura	O	OR C	C	R
Barn Owl	Tyto alba	P	OR	U	R
Screech Owl	Otus asio	P	OR	U	R
Great Horned Owl	Bubo virginianus	P	OR	U	R
Pygmy Owl	Glaucidium gnoma	P	OR	R	R
Vaux's Swift	Chaetura vauxi	P	Ar	U	M
White-throated Swift	Aeronautes sayatalis	P	Ar	C	M
Black-chinned Hummingbird	Archilochus alexandri	P	OR Ch	U	M SU
Costa's Hummingbird	Calypte costae	O	Ch	C	M SU
Anna's Hummingbird	Calypte anna	O	OR Ch C	C	R
Common Flicker	Colaptes auratus	O	OR C	C	R

Common Name	Scientific Name	P/O[1]	Habitat[2]	Occurrence[3]	Status[4]
Acorn Woodpecker	Melanerpes formiciuorus	O	OR	C	R
Downy Woodpecker	Dendrocopus pubescens	P	OR	C	R
Nuttall's Woodpecker	Dendrocopus nuttallii	O	OR	C	R
Western Kingbird	Tyrannus verticalis	P	OR	U	M
Cassir's Kingbird	Tyrannus vociferans	P	OR	U	R
Ash-throated Flycatcher	Myiarchus cinerascens	O	OR	C	M SU
Black Phoebe	Sayornis nigricans	P	OR	C	R
Says Phoebe	Sayornis saya	P	Ch C	U	W
Dusky Flycatcher	Empidonax oberholseri	P	OR Ch	U	M
Western Flycatcher	Empidonax fulvifrons	P	OR	C	M SU
Western Wood Pewee	Contopus sordidulus	O	OR	C	M SU
Rough-winged Swallow	Stelgidopteryx ruficollis	O	Ar	U	M SU
Scrub Jay	Aphelocoma coerulescens	O	OR Ch C	C	R
Common Raven	Corvus corax	O	OR	C	R
Common Crow	Corvus brachyrhynchos	O	OR	U	R
Plain Titmouse	Parus inornatus	O	OR C Ch	C	R
Bushtit	Psaltriparus minimus	O	OR C Ch	C	R
White-breasted Nuthatch	Sitta carolinensis	O	OR	C	R
Wrentit	Chamaea fasciata	O	Ch	C	R
House Wren	Troglodytes aedon	O	OR	C	M SU
Bewick's Wren	Thryomanes bewickii	O	OR Ch C	C	R
Mockingbird	Mimus polyglottos	P	Ch	U	R
California Thrasher	Toyostoma redivivum	O	Ch	C	R
American Robin	Turdus migratorius	P	OR	C	M W
Hermit Thrush	Catharus guttatus	P	OR Ch	C	M W

Common Name	Scientific Name	P/O[1]	Habitat[2]	Occurrence[3]	Status[4]
Swainson's Thrush	Catharus ustulatus	P	OR Ch	U	M SU
Western Bluebird	Sialia mexicana	P	OR	U	R
Blue-gray Gnatcatcher	Polioptila caerulea	O	OR Ch C	C	R W
Ruby-crowned Kinglet	Regulus calendula	P	OR Ch C	C	M W
Loggerhead Shrike	Lanius ludovicianus	P	Ch C	U	R
European Starling	Sturnus vulgaris	P	OR	C	R
Hutton's Vireo	Vireo huttoni	O	OR Ch C	C	R
Gray Vireo	Vireo vicinior	P	Ch	R	SU
Orange-crowned Warbler	Vermivora celata	O	OR Ch	C	R W
Yellow Warbler	Dendroica petechia	P	OR	U	M
Yellow-rumped Warbler	Dendroica coronata	P	OR	C	M W
Black-throated Gray Warbler	Dendroica nigrescens	P	OR	U	M
Townsend's Warbler	Dendroica townsendi	P	OR	R	M
Wilson's Warbler	Wilsonia pusilla	O	OR	U	M
Hooded Oriole	Icterus cucullatus	P	OR	U	M
Northern Oriole	Icterus galbula	P	OR	C	M
Lazuli Bunting	Passerina amoena	P	OR Ch	U	M
Purple Finch	Carpodacus purpureus	P	OR	U	W
House Finch	Carpodacus mexicanus	O	OR	C	R
American Goldfinch	Spinus tristis	P	OR Ch	U	R
Lesser Goldfinch	Spinus psaltria	O	OR Ch	C	R
Larence's Goldfinch	Spinus lawrencei	O	OR Ch	U	SU
Rufous-sided Towhee	Pipilo erythrophthalmus	O	Ch OR	C	R
Brown Towhee	Pipilo fuscus	O	Ch OR	C	R
Rufous-crowned Sparrow	Aimophila ruficeps	P	Ch	U	R

Common Name	Scientific Name	P/O[1]	Habitat[2]	Occurrence[3]	Status[4]
Sage Sparrow	Amphispiza belli	O	Ch	U	R
Dark-eyed Junco	Junco hyemalis	O	OR	C	R W
White-crowned Sparrow	Zonotrichia leucophrys	P	OR	C	W
Golden-crowned Sparrow	Zonotrichia atriacapilla	P	OR	U	W
Song Sparrow	Melospiza melodia	P	OR	U	R

[1] P = predicted to occur; O = observed to occur (The observed portion of this checklist was based on two censuses, one on May 26, 1979 and the second on August 11, 1979.)

[2] Ch = chaparral; OR = oak/riparian; C = cypress; Ar = air space above vegetation.

[3] A = accidental; R = rare; U = uncommon, but regularly seen, C = commonly seen.

[4] SU = summer visitant; W = winter visitant; M = migrant; R = resident; U = unpredictable.

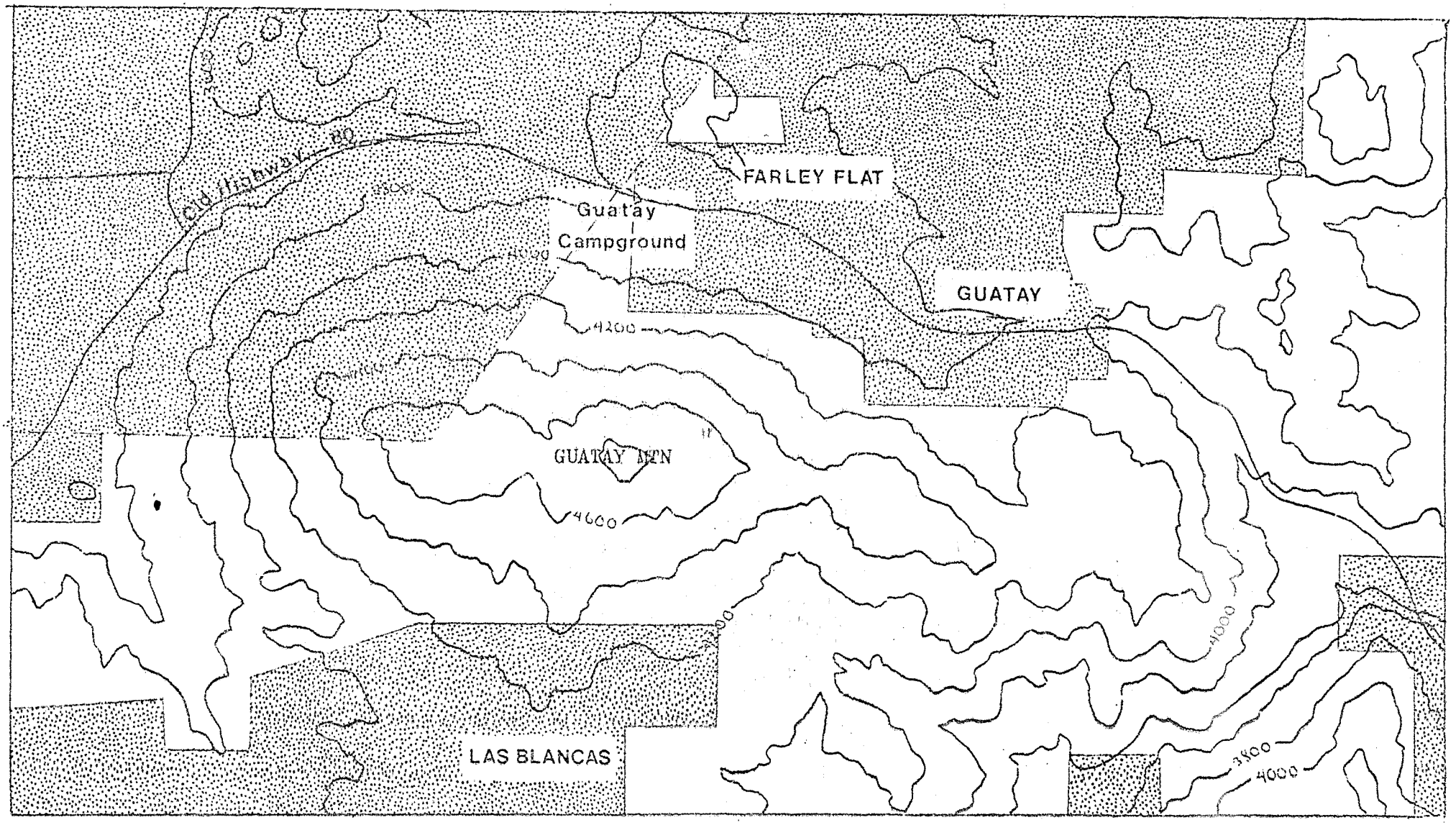

Figure 1. Map of public and private land holdings on Guatay mountain.

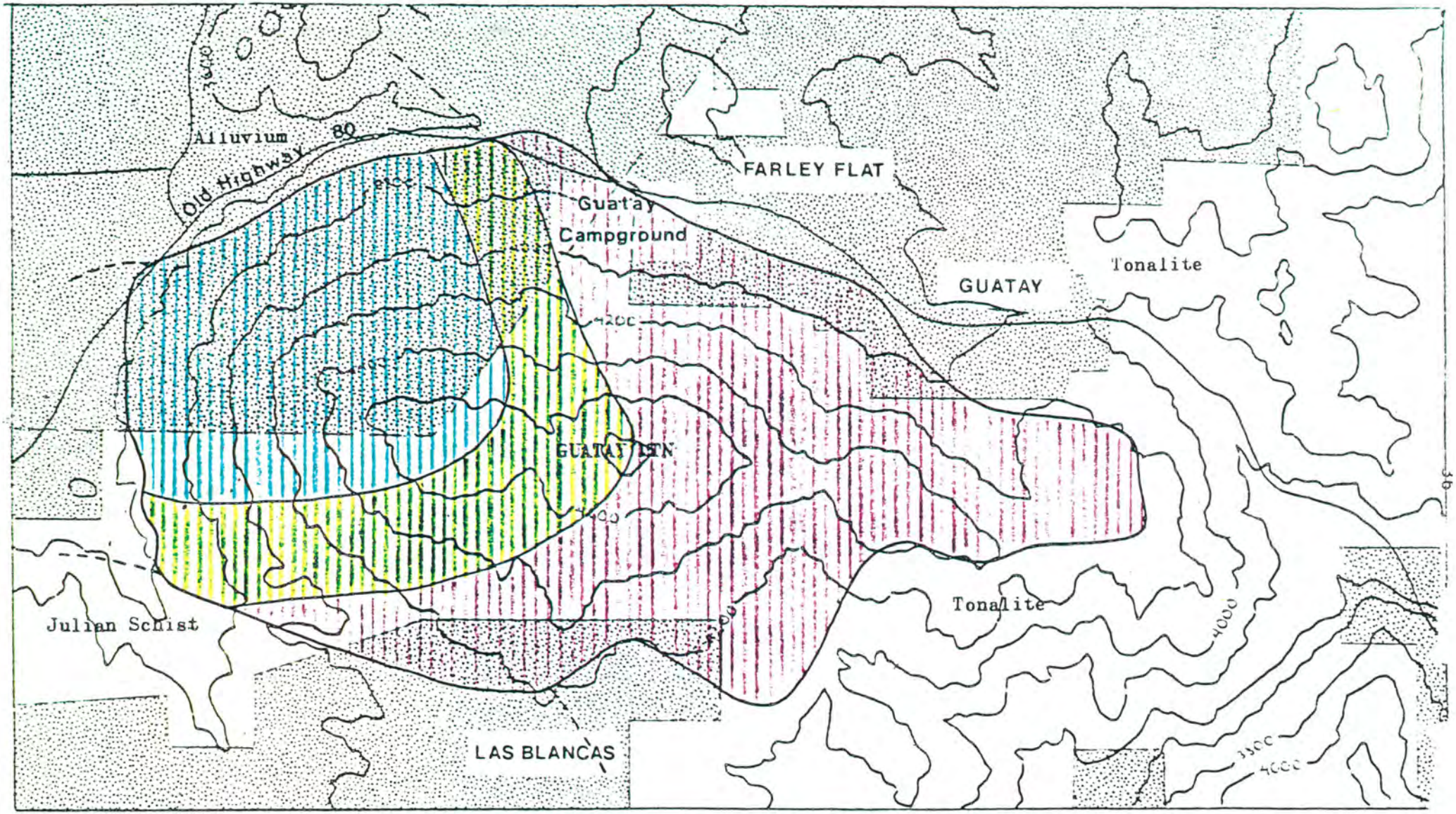

Figure 2. Location of gabbroic rock on Guatay mountain
(from Nishimori, 1976)

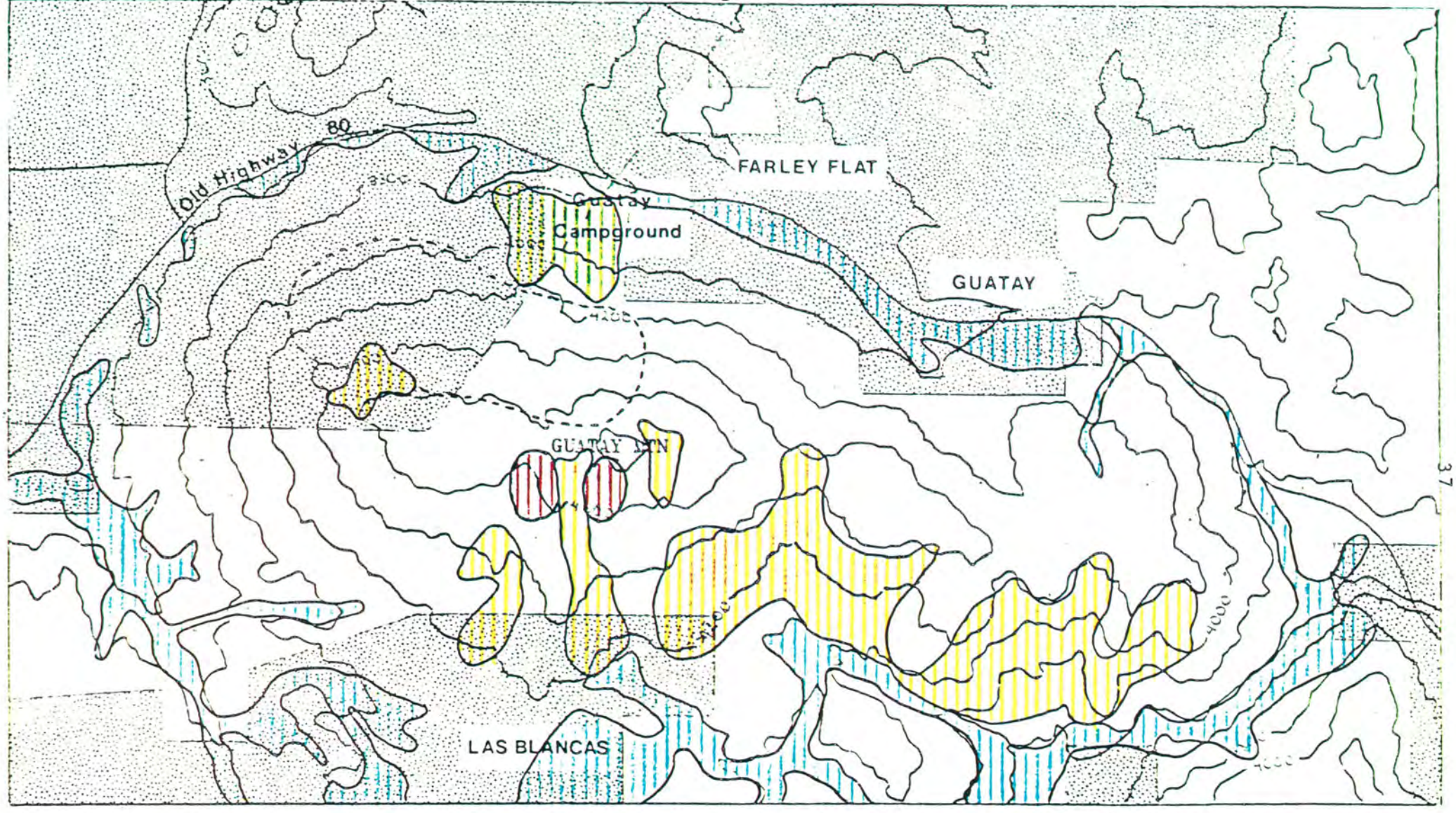

Figure 3. Map of the vegetation types on Guatay mountain south of Old Highway 80. Uncolored areas are California mixed chaparral. Dashed line encloses area where oak "islands" occur (see text).

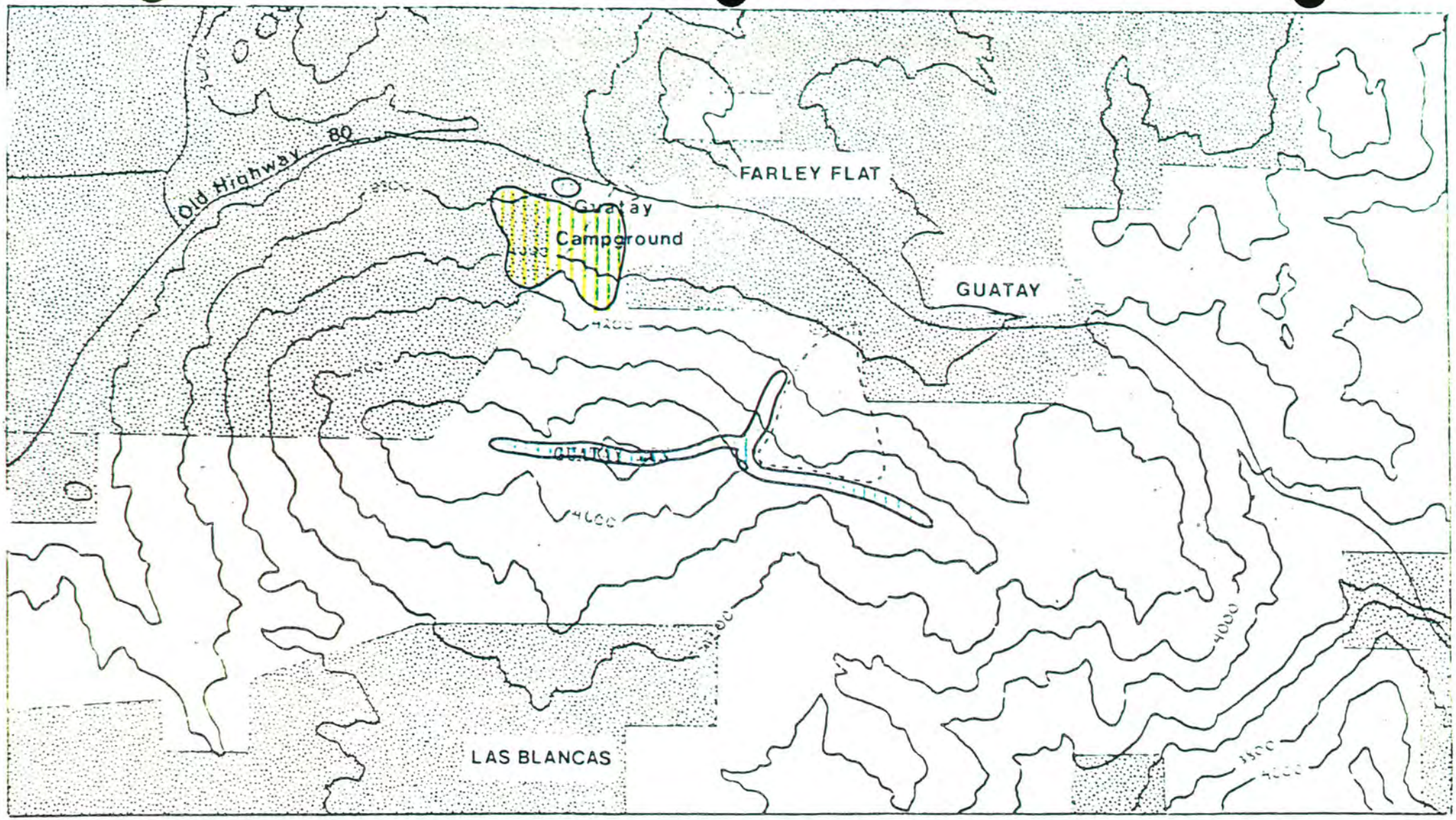

Figure 4. Locations of rare plants on Guatay mountain. Dashed line encircles area where scattered cypress trees occur (see text).

Contours taken from USGS topographic 7.5' sheet, Descanso 200 ft intervals

Scale 1:24000

North

0 1 mile

Legend:

- Private land
- National Forest
- Calochortus dunnii, Mimulus clevelandii and Calamagrostis densa
- Cupressus forbesii

Photo 1. Mixed chaparral with well-developed understory including Salvia sonomensis. Scattered cypress trees are east of main stand.

Photo 2. Inside main stand of Cupressus forbesii. Dense pockets of cypress are interspersed with mixed chaparral.

Photo 3. Dense "islands" of Quercus chrysolepis separated by mixed chaparral, north side of Guatay Mountain.

Photo 4. Haplopappus arborescens association on south slope of main peak, Guatay Moutnain.